Foreword

Manual instruction

Thanks for purchasing our UPS, it is safe and reliable, so few maintenance is required.

Read this manual carefully and completely. It includes instructions of safety installation and operation. They will help your UPS obtain the longest life and service. This manual accounts the internal working principle and the relative protection functions. This manual also contains information about the usage of the equipment.

Please obey the instructions and all the warning stated in the manual or on the machine. Don’t operate the machine before finishing reading the safety and operation instructions.

Note: Because of the continuous improvements, our products may differ somewhat from the contents included in this manual. You can contact local office to get the information when necessary.

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1. Safety instruction

Abstract

This chapter mainly introduce the safety marks and notes of 1KVA-3KVA LED series on-line UPS. Read this chapter carefully before operating on the equipment.

1.1 Safety instruction

There is dangerous voltage and high temperature inside the UPS. During the installation, operation and maintenance, please abide the local safety instructions and relative laws, otherwise it will result in personnel injury or equipment damage. Safety instructions in this manual act as a supplementary for the local safety instructions.

Our company will not assume the liability that caused by disobey of safety instructions. Please note the following:

1. Don’t use the UPS when the actual load exceeds the rated load.
2. There are high-capacity batteries in the standard type UPS. You mustn’t open the enclosure or it will lead to electric shock. If it needs internal maintenance or battery replacement, please send it to the designated site.
3. Internal short-circuit of the UPS will cause electric shock or fire. So don’t place the containers equipped with liquid on the top of the UPS so as not to cause danger of electric shock and so on.
4. Don’t put the UPS in a place with high temperature or humidity as well as the corrosive gas, much dust.
5. Keep good air circulation between in-vent on front panel and out-vent on back panel.
6. Avoid direct sunlight or near heat-dispensed objects.
7. In case that the smoke appears on the UPS, please cut off the power as soon as possible and contact the dealer service site.

1.2 Symbols indication

The safety symbols cited in this manual are shown in table 1-1, which are used to inform readers of safety issues that should be obeyed when installation, operation and maintenance.

Safety Symbol	Indication
	Attention
	Static discharge sensitive
	Electric shock

There are three levers of safety grade: Dangerous, Warning and Attention. The remark is on the right side of the safety symbol, the detailed comments is behind, shown as following:

Dangerous

Indicate risk of serious injury or death or seriously damage the equipment

Warning:

Indicate risk of serious injury or damage the equipment.

Attention:

Indicate risk of injury or damage the equipment.

2. Product Introduction

2.1 The appearance of the product

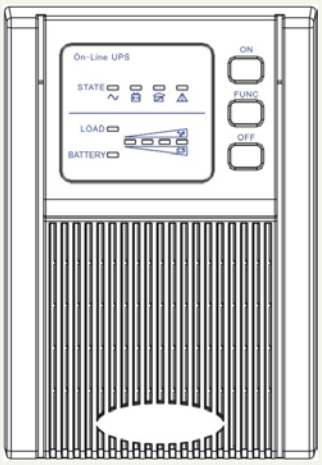


Fig.1 Front Panel view

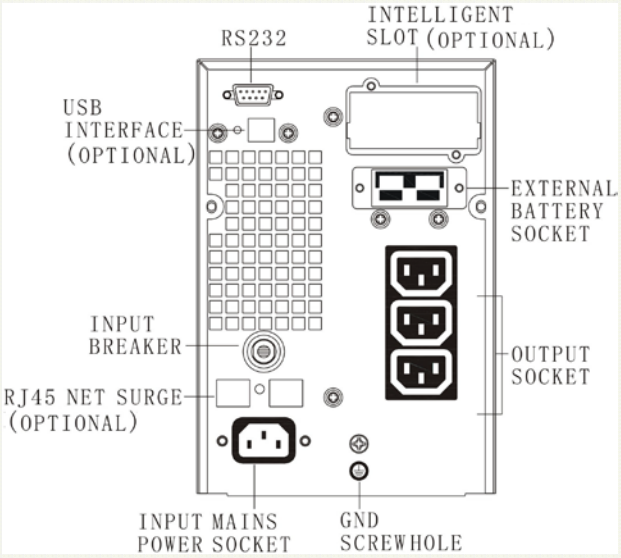


Fig.2 1KVA Rear Panel view

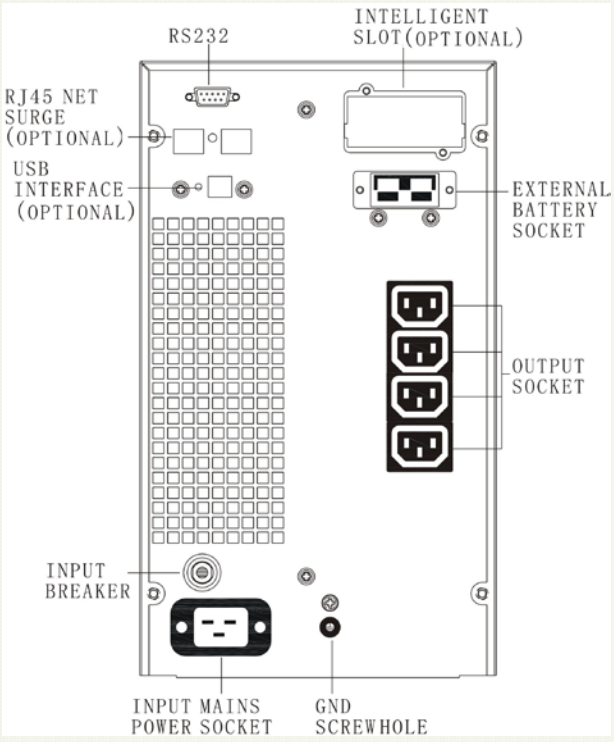


Fig.3 2KVA/3KVA Rear Panel view

OUTPUT SOCKET TYPE	
USA STANDARD SOCKET	IEC SOCKET
CHINESE STANDARD SOCKET	INDIAN STANDARD SOCKET
UNIVERSAL SOCKET	SOUTH AFRICA SOCKET
GERMANY STANDARD SOCKET	AUSTRALIAN STANDARD SOCKET
WIRING SOCKET	

Fig. 4 Output Socket Type

2.2 The principle of the product

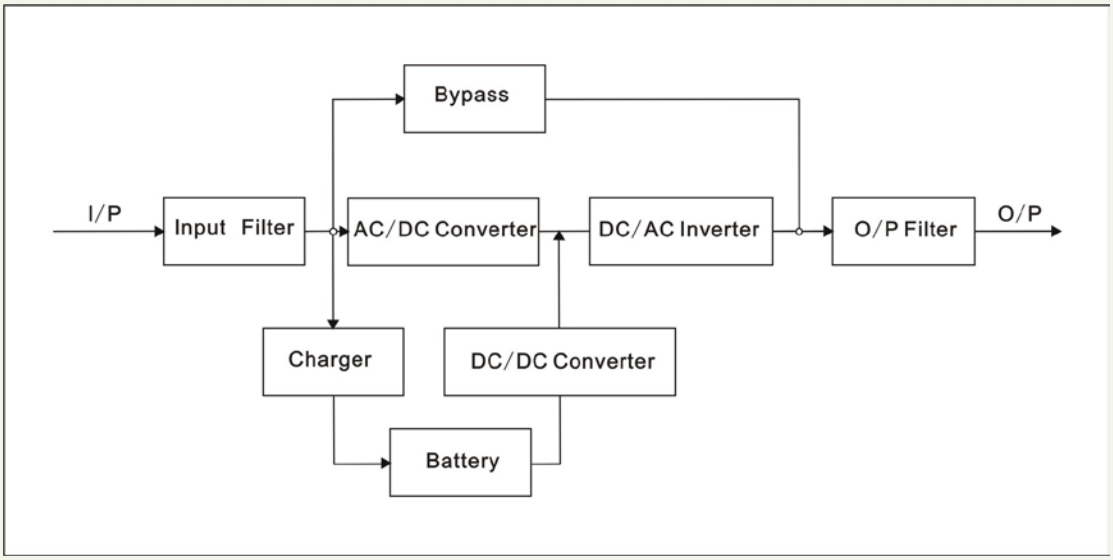


Fig 5 UPS Principle Diagram

1. input filter: Complete filtering the input AC utility power to provide the clean power for UPS.
2. AC/DC converter: Convert the filtered AC mains to DC and boost the DC for DC/AC inverter.
3. DC/DC booster: When the UPS works in battery mode, the circuit boosts the DC for DC/AC inverter.
4. DC/AC inverter: Convert the boosted DC to stable AC output.
5. Bypass: When overload or failure of inverting happen in the UPS, it transfers to bypass mode to supply power to loads.
6. Charger: Standard unit provides 1A; long backup unit provides 4A.
7. Battery: Sealed Lead Acid Battery.
8. Output filter: Complete filtering the output of the UPS to provide the clean power for loads.

2.3 Model

UPS sort		MODEL NO	Remark
Standard unit	1KVA	1KVAS	Internal 1A charger, 2 pcs 7AH batteries
	2KVA	2KVAS	Internal 1A charger, 4 pcs 7AH batteries
	3KVA	3KVAS	Internal 1A charger, 6 pcs 7AH batteries
Long backup unit	1KVA	1KVAH	★internal 4A charger, external 24V battery
	2KVA	2KVAH	★internal 4A charger, external 48V battery
	3KVA	3KVAH	★internal 4A charger, external 72V battery

The 12V/9AH battery which is sealed lead acid maintenance free can be chosen as internal battery of the standard unit.
The 7A charger can be chosen as internal charger of the long backup unit.
Two internal chargers can be used in long backup unit.

3. Installation

3.1 Unpacking and inspection

1. Unpacking the UPS and check that whether it's damaged during the transportation. If damaged or some parts missing, don't start the machine and inform the carrier and franchiser.
2. Check the annex (please consult Appendix Table 1).
3. Check if the equipment is just what you wanted to purchase. You can affirm through inspecting the model number on back panel of the equipment.

3.2 Notes

1. Please place the UPS in a clean, stable environment, avoid the vibration, dust, too humidity, flammable gas and liquid, corrosive.
2. The ambient temperature around UPS should keep in a range of 0℃～40℃. If UPS works above 40℃, it is required that the rated value of the largest load decreases 12% while the temperature increases the every 5℃. The highest temperature cannot be more than 50℃ when UPS works.
3. UPS should be placed in a sufficiently ventilated place.

3.3 UPS input connection

Connect the UPS to the mains by input power cable

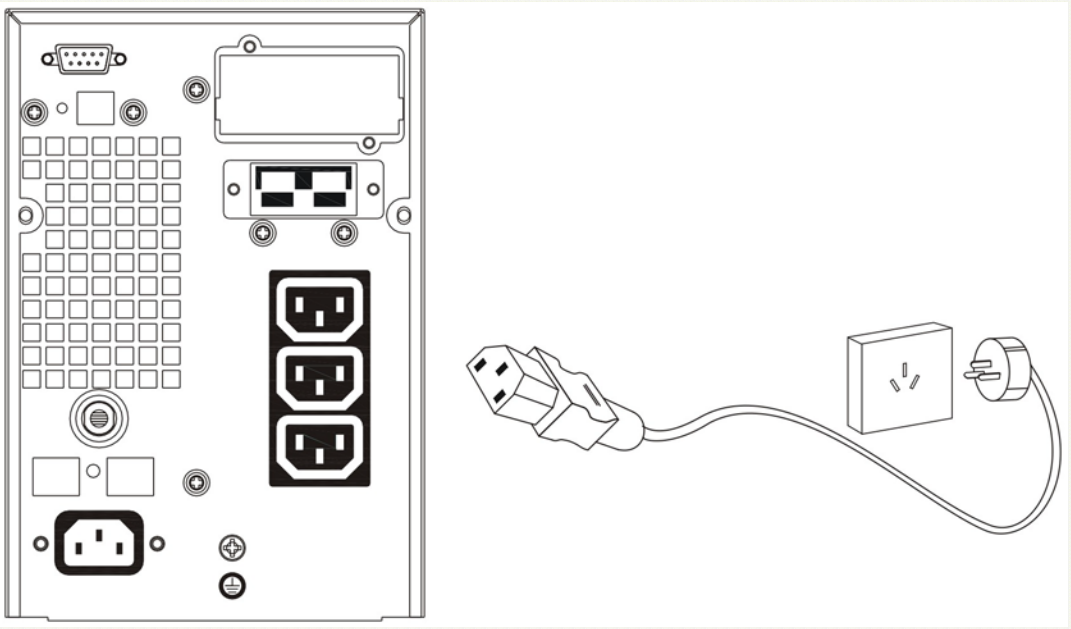


Fig 6 Input Connection

3.4 UPS output connection

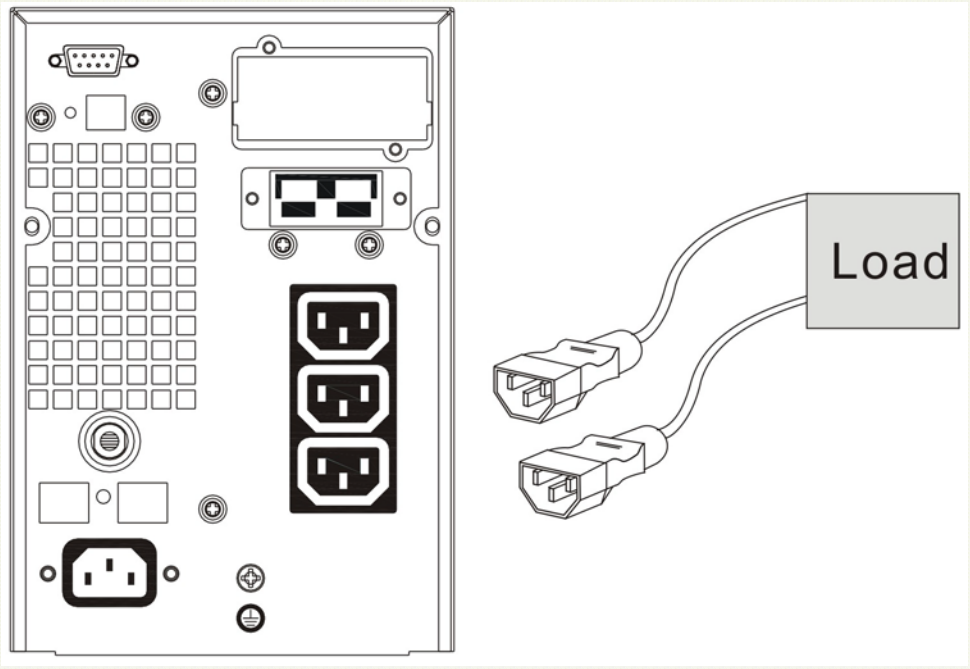


Fig 7 output connection

3.5 Long backup external battery connection

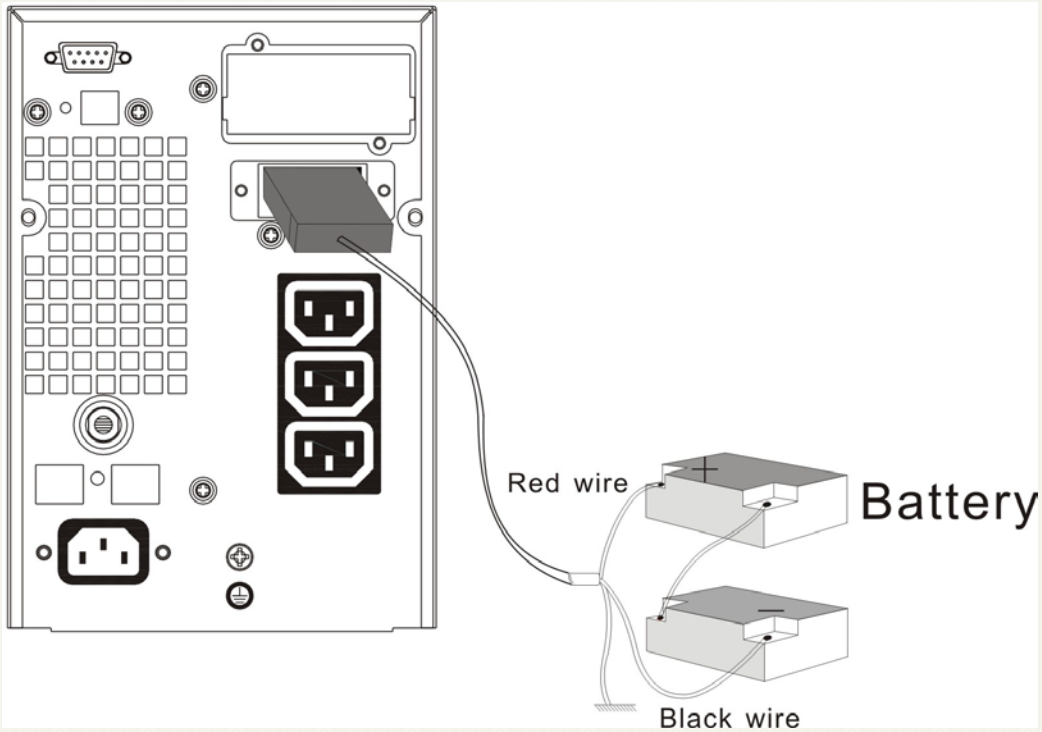


Fig 8 battery connection

⚠Warning:

★Before installing battery, make sure that UPS and breaker are all turned off. Remove all your metallic adornment such as finger ring, watch, and so on before connecting battery.

★No anti-connection or short circuit between the battery anode and cathode forever. Red cable connect with battery anode “+” and black cable connect with cathode “-”.

★Please use the screwdriver with insulating handle. Do not lay the tools or metallic goods on the battery.

⚠Notice:

★When using the external battery, It is best to use external battery cable which matches with the equipment.

★When connecting load to UPS, first turn off load and then connect the power cable and finally turn on load one-by-one.

★Inductance loads such as motor, fluorescent lamp, copy cat are strictly prohibited connecting to UPS to avoid damage.

★Plug UPS on the special socket with over-current protection, the power socket that used should be connected with ground wire.

★UPS is likely to have output voltage no matter whether the power input cable is plugged in mains input socket. If you wish UPS have no output, first break off the switch and then cancel the mains.
★When connect laser printer, select the capacity of UPS according to the UPS start power because the startup power is higher.

4. Panel display, operation and running

The operation is simple, operators only need to read the manual and follow the operation instructions listed in this manual without any special training.

4.1 Faceplate display illumination

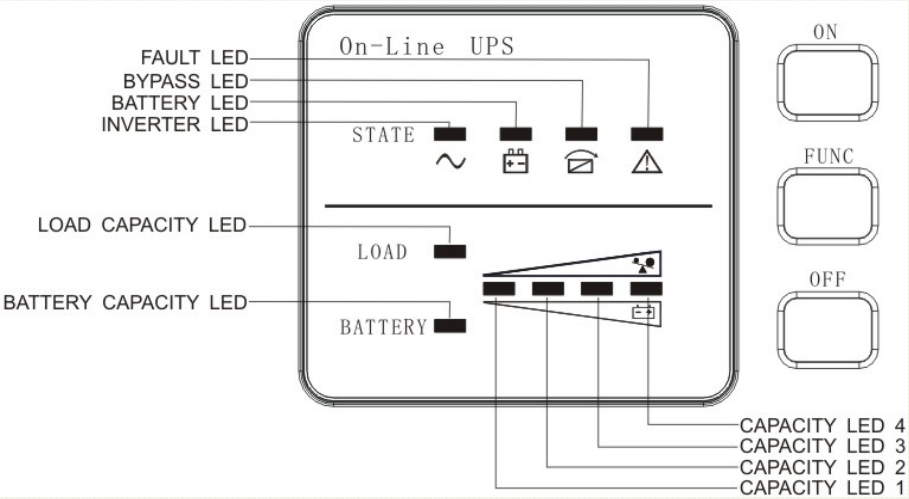


Fig 9 front panel instruction

The LED display on the front panel mainly comprises status section and capacity section. The status section including inverter LED, battery LED, bypass LED and fault LED displays the current status of the UPS, the capacity section displays the capacity of the battery and load, comprising load capacity LED, battery capacity LED and capacity LED(1～4).
The operation section on front panel is composed of ON key, OFF key and Function key.

ON key
Press and hold this key for a second to turn on the UPS.
OFF key
Press and hold this key for a second to turn off the UPS.

Function key
Press and hold this key for more than half a second and less than 2 seconds to transfer between the battery capacity and load capacity.
Press and hold this key for more than 2 seconds in battery mode or fault mode: the UPS runs the mute function, Press and hold this key for more than 2 seconds in mains mode: the UPS runs the self-test function.
inverter LED:
Indicate that the power on load is provided by inverter of the UPS when it is on.
Battery LED:
Indicate the power from the battery is provided to the load by the inverter when it is on; if it flashes, it means that the battery voltage is too low and the power in battery will be used up.
Bypass LED:
Indicate that the power on load is from the AC mains through the bypass when it is on.
Fault LED:
Indicate the UPS is abnormal when it is on, if it flashes, it shows that the UPS is warning.
Load capacity LED:
Indicate the load capacity when it is on.
Battery capacity LED:
Indicate the battery capacity when it is on.
Capacity LED(1～4)
It will display the corresponding capacity according to the load LED or battery LED, the detail capacity can be seen from the table below:

Capacity LED	percentage
Capacity LED 1	0-25%
Capacity LED 2	25%-50%
Capacity LED 3	50%－75%
Capacity LED 4	75%－100%

When display the load capacity, it means overload and warning if all the capacity LEDs flash, when display the battery capacity, it shows the battery voltage is too low and warning if the capacity LED 1 flashes.

4.2 Operation

4.2.1 Start up operation

Turn on the UPS in Line mode

① Once mains power is plugged in, the UPS will charge the battery, at the moment, the capacity section displays the battery capacity(the function key can be used to display the battery capacity).

② Press and hold the ON key for more than a second to start the UPS, then it will start the inverter.

③ Once started, the UPS will perform a self-test function, inverter, battery, bypass and fault LEDs will light and go out circularly and orderly. When self-test finishes, it will come to line mode, the corresponding inverter LED lights, UPS is working in line mode.

Turn on the UPS by DC without mains power

① When mains power is disconnected, press and hold the ON key for more than a second to start UPS.

② The display on the panel in the process of start is almost the same as that when mains power is in. After finishing the self-test, the corresponding inverter LED and battery LED are on, and UPS is working in battery mode.

4.2.2 Turn off operation

Turn off the UPS in line mode

① Press and hold the OFF key for more than a second to turn off the UPS, in other words, turn off the inverter.

② After UPS shutting down, the four indicators all go out and there is no output.

Turn off the UPS by DC without mains power

① Press and hold the OFF key for more than a second to turn off the UPS.

② When turning off the UPS, it will do self-testing firstly. The inverter, battery, bypass and fault LEDs light and go out circularly and orderly until there is no display on the panel.

4.2.3 Self-test/mute test operation.

① When UPS is in line mode, press and hold the function key for more than 2 seconds, the inverter, battery, bypass and fault LEDs light and go out circularly and orderly. UPS comes to self-test mode and

tests its status and the battery backup capacity. It will exit automatically after finishing testing, LED resume.
② When UPS is in battery mode or fault mode, press and hold the function key for more than 2 seconds, the buzzer mutes. If you press and hold the function key for more than 2 seconds again, it will restart to beep.

4.3 Run mode

4.3.1 Bypass mode

LED indications on front panel in bypass mode are as following:

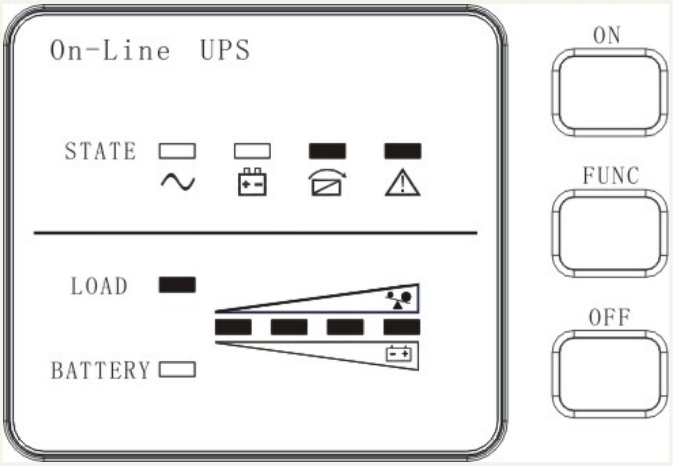


Fig 10 Running in bypass mode

Only when overload and faults happen in line mode, it will turn to bypass mode and provide warning function, the bypass LED is on and buzzer beeps. When beeping, the fault LED lights and the load capacity is displayed (the function key can be used to display the battery capacity).
NOTE: When UPS is working in bypass mode, it has no back up function.

4.3.2 Line mode

LED indications on front panel in line mode are as following:

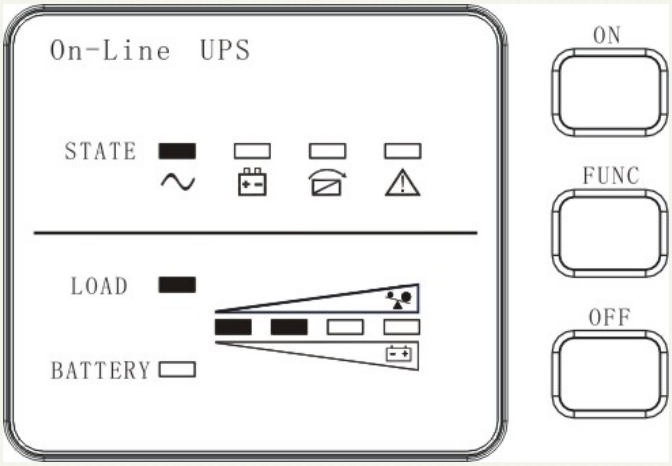


Fig 11 Running in Line mode

When input AC mains is in line with the working conditions, UPS will work in line mode. The inverter LED lights and the load capacity is displayed (the function key can be used to display the battery capacity).

When UPS works in Line mode, the inverter LED flash means that the live and the neutral are anti-connected. The UPS can still work in Line mode.

When load capacity is displayed, all the capacity LEDs(1～4)flash shows too many loads connected. The buzzer beeps twice per second. Remove the unnecessary load until it is less than 100% full load.

4.3.3 Battery mode

LED indications on front panel in battery mode are as following:

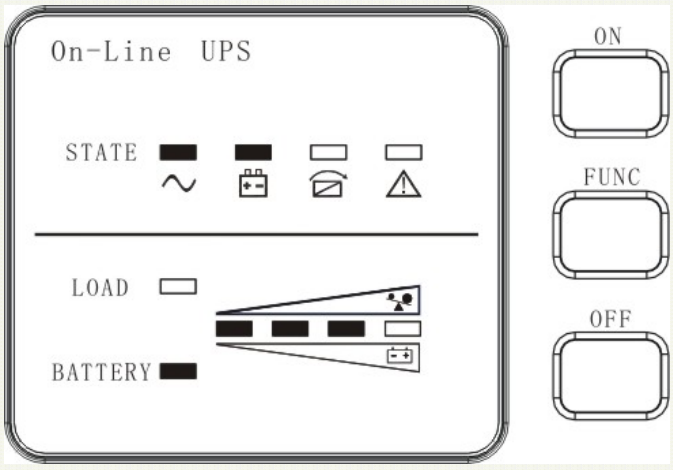


Fig 12 Running in battery mode

When the mains power down or instable, UPS will turn to battery mode at once. Now, the inverter LED and battery LED are on while the battery capacity is displayed on capacity section (the function key can be used to display the load capacity).

When UPS runs in battery mode, the buzzer beeps every 4 seconds. The buzzer will stop beeping if the function key is pressed and held for more than 2 seconds (if the battery voltage is low, the buzzer will return to beep, press and hold the function key for more than 2 seconds, it will stop beeping). Press and hold the function key for more than 2 seconds, the buzzer will beep again.

4.3.4 Fault mode

LED indications on front panel in Fault mode are as following:

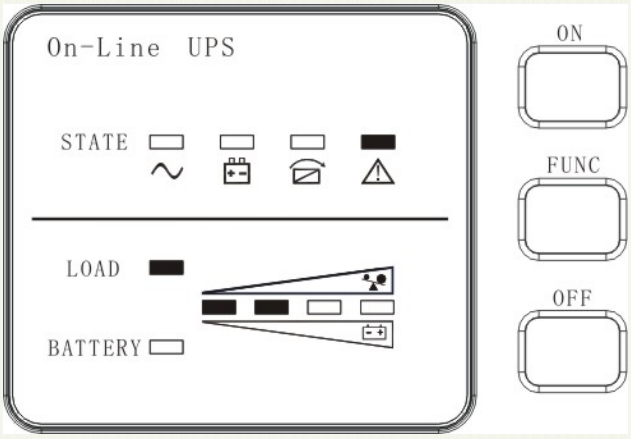


Fig 13 Running in fault mode

When UPS has fault. The fault LED is on and the buzzer beeps. UPS will turn to fault mode. if the AC line connected, UPS will turn to bypass mode; if not, UPS will cut off the output. The capacity LEDs ((1～4) will display the corresponding fault LED. At the moment, you can press the function key to make the buzzer stop beeping temporarily to wait for maintenance. You can also press the OFF key to shut down the UPS after cut off the load normally.

NOTE: As for LED information in different modes, please refer to LED/Display Panel and Warning Table in Appendix.

NOTICE:

★The following process must be performed if UPS is connected with generator:

★First turn on generator, after it runs stably connect output power of generator to UPS input terminal, then turn on UPS. After UPS turned on, please connect load one-by-one.

★ It is recommended that the generator capacity is as twice as UPS rated capacity.

5. Maintenance

Only minimum maintenance is required for this series of UPS. The battery is sealed lead acid maintenance free. It only needs to be kept charging to obtain the expected life.. Whether it is started or not, the UPS would charge batteries once it is connected to mains and provides protection for over-charging and deep discharging.

5.1 Battery maintenance

1. It is recommended that the batteries are manually charged or discharged
   once every three or four months if UPS has not been used for a long time or the power is long-term uninterruptible. The battery will be fully discharge to low-voltage protection shutdown. Then it needs to be fully charged once.
2. In high temperature area, batteries should be manually charged and discharged once every two months. The process is the same as that said above.
3. Under normal circumstances of using, the battery working life is three to five years. If you find that the battery do not act well such as obviously shortening of backup time, too much imbalance on battery voltage so on, the battery should be replaced as soon as possible, which must be performed by qualified personnel.
4. When replace battery, it is recommended to change battery all together instead of changing separately.

NOTICE：

★Before replacing batteries, first please turn off the UPS and break off the mains. Remove your metallic adornment such as finger ring, watch and so on.

★When replace batteries, please use the screwdriver with insulating handle. Do not lay the tools or metallic goods on the battery.。

★Never reverse or short circuit between the battery anode and cathode.

6. Troubleshooting and performance of product

The following messages are the information that users would find on UPS when it meets some problems. Users can judge if the fault is caused by external factors and know how to deal with it by making full use of the information.

1. Fault LED on, indicates that the UPS has detected some faults.
2. Buzzer beeps, indicates that UPS need to be paid attention to, if beeps for a long time, it means that there is something wrong with the machine.
3. If you need help, contact our service department, the following messages should be provided for analysis:
   - ◆UPS MODEL NO. and SERIAL NO.
   - ◆Date of fault happened
   - ◆Detailed description of the problem (include indicator statements on panel)

6.1 Fault LED indication and warning table

Appendix1: Fault Codes

Fault causation	Capacity LED1	Capacity LED 2	Capacity LED 3	Capacity LED 4
High Bus voltage	●			
Low Bus voltage		●		
Unbalanced Bus voltage			●	
Bus soft-start failure				●
High inverter voltage	●	●		
Low inverter voltage	●		●	
Inverter soft-start failure	●			●
Bus discharge failure		●	●	
Over Heat		●		●
Output short circuit			●	●
Overload	●	●	●	
Output Relay Fault	●	●		●
Input NTC Fault	●		●	●
Auxiliary Power Fault		●	●	●
Input Fuse fault	●	●	●	●

- LED is on for a long time

Appendix 2: The corresponding working status of indications

NO	Working status	Indication				Warning	Remarks
		Nor	Bat	Bps	Fau		
1	Line mode						
	Normal voltage	●				None	
	LN anti-connected	★				None	Check if the LN is anti-connected
	High/low voltage protection, turn to battery mode	●	●		★	Once every four seconds	
2	Battery mode						
	Normal voltage	●	●		★	Once every four seconds	
	Battery Voltage abnormal warning	●	★		★	Once per second	
3	Battery disconnect warning						
	Bypass mode			●	★	Once every four seconds	Affirm if the battery switch is closed
	Power up or start	▲	▲	▲	▲	Six times	Affirm if the battery is connected well
4	Output overload protection						
	Overload warning in line mode	●			★	Twice per seconds	Remove the less important loads
	Overload in line mode, protection			●	●	Long beeps	Remove the less important loads
	Overload in battery mode, warning	●	●		★	Twice per second	Remove the less important loads
	Overload in battery mode, protection	●	●		●	Long beeps	Remove the less important loads
5	Fan fault	▲	▲	▲	★	Once every 2 seconds	Check if the fan is blocked by object.

● _indicator lights for a long time

★ _indicator flashes

▲ _the status of indicator depends on other conditions

NOTE: When UPS has fault, it is convenient for you to know the working status of UPS and the exact information about the fault promptly by referring to the two tables listed above.

6.2 Troubleshooting

When the fault occurs, firstly, perform troubleshooting by referring to the troubleshooting table. If the fault still exists, please contact the franchiser.

Fault	Cause	Solution
The inverter LED flashes	Anti-connection of mains live and neutral	Re-connect the input power cable and make a correct connection
Battery LED flashes	Battery low voltage or battery disconnected	Check UPS battery, connect battery well, if battery damaged, replace it
Mains normal, but UPS has no input	UPS input breaker open circuit	Press the breaker for reset
Short back up time	Battery not fully charged	Keep UPS connecting with mains power for more than 8 hours, recharge battery
	UPS overload	Check the usage of loads, remove some redundant devices
	Battery aged	When replace battery, contact franchiser to get battery and relative assembly
UPS can't startup after pressing the ON key	Press the ON key for a short time	Press and hold the ON key for more than one second to start the UPS
	UPS has no battery connected or battery voltage low and too many loads connected	Connect UPS battery well, if battery voltage low, please turn off UPS and remove some loads, then start UPS
	Fault occurs inside UPS	Contact supplier for servicing
The capacity LEDs (1-4) flash in line mode when display the battery capacity	Charger doesn't work normally or battery aged	Contact supplier for servicing

6.3 EMC standard/Safety standard

◆Our product are manufactured according to the following EMC international grade standard and has passed the CE authentication：

EMC standard number	Safety standard number
IEC62040-2	IEC62040－1
IEC61000-4-2	GB4943-2005
IEC61000-4-3	
IEC61000-4-4	
IEC61000-4-5	

6.4 Product Performance

<table>
<tr><td colspan="3">Model</td><td>1KVAS</td><td>1KVAH</td><td>2KVAS</td><td>2KVAH</td><td>3KVAS</td><td>3KVAH</td></tr>
<tr><td colspan="3">Rated capacity</td><td colspan="2">700W/1000VA</td><td colspan="2">1400W/2000VA</td><td colspan="2">2100W/3000VA</td></tr>
<tr><td rowspan="7">input</td><td colspan="2">input</td><td colspan="6">Single phase and earthing</td></tr>
<tr><td colspan="2">Voltage range</td><td colspan="6">115±5VAC-295±5VAC</td></tr>
<tr><td colspan="2">Frequency range</td><td colspan="6">45Hz-55Hz@50HZ/55Hz-65Hz@60HZ</td></tr>
<tr><td colspan="2">Power factor</td><td colspan="6">≥0.98</td></tr>
<tr><td colspan="2">ECO range</td><td colspan="6">Setting output voltage±20VAC</td></tr>
<tr><td colspan="2">Bypass range</td><td colspan="6">186VAC-252VAC</td></tr>
<tr><td colspan="2">Current harmonic</td><td colspan="6">≤7%(100% nonlinear load)</td></tr>
<tr><td rowspan="11">output</td><td colspan="2">Output style</td><td colspan="6">Single phase and earthing</td></tr>
<tr><td colspan="2">Rated voltage</td><td colspan="6">208/220/230/240VAC</td></tr>
<tr><td colspan="2">Power factor</td><td colspan="6">0.7</td></tr>
<tr><td colspan="2">Voltage precision</td><td colspan="6">±2%</td></tr>
<tr><td rowspan="2">Output Fre-quency</td><td>Line mode</td><td colspan="6">1、When input frequency is in the range，the output frequency is the same as that of input.
2、When input frequency is out of the range，the output frequency is (50/60±0.2)Hz when turn to battery mode</td></tr>
<tr><td>Battery</td><td colspan="6">(50/60±0.2)Hz</td></tr>
<tr><td colspan="2">Crest ratio</td><td colspan="6">3：1</td></tr>
<tr><td colspan="2" rowspan="2">Transfer time</td><td colspan="6">Mains ←→ battery =0ms</td></tr>
<tr><td colspan="6">Mains ←→ bypass ＜4ms</td></tr>
<tr><td rowspan="2">Overload capacity</td><td>Battery mode</td><td colspan="6">108%±5%<load≤150%±5% ＞30s cut off output and warn,
150%±5%<load<200%±5% ＞ 300ms cut off output and warn</td></tr>
<tr><td>Line mode</td><td colspan="6">108%±5%<load≤150%±5% ＞ 30s transfer to bypass and warn
150%±5%<load<200%±5% ＞300ms transfer to bypass and warn</td></tr>
<tr><td rowspan="2">efficiency</td><td>Mains</td><td colspan="6">Full load≥86%</td></tr>
<tr><td>Battery mode</td><td colspan="6">Full load≥84%</td></tr>
<tr><td rowspan="2">Output voltage distortion</td><td colspan="6">≤3%(100% linear load)</td></tr>
<tr><td colspan="6">≤5%(100% nonlinear load)</td></tr>
<tr><td rowspan="5">battery</td><td colspan="2">Input battery voltage</td><td>24VDC</td><td>24VDC</td><td>48VDC</td><td>48VDC</td><td>72VDC</td><td>72VDC</td></tr>
<tr><td colspan="2">Internal battery capacity</td><td>2</td><td></td><td>4</td><td></td><td>6</td><td></td></tr>
<tr><td colspan="2">Internal battery type</td><td colspan="6">12V/7AH sealed lead acid maintenance free battery (only refers to standard UPS)</td></tr>
<tr><td colspan="2">Backup time</td><td colspan="6">Full load ≥4min（only refers to standard UPS），As for long backup UPS, the backup time is determined by the capacity of battery.</td></tr>
<tr><td colspan="2">Charge current（A）</td><td>1</td><td>4</td><td>1</td><td>4</td><td>1</td><td>4</td></tr>
</table>

NOTE: The rated output voltage has been already provided.

◆ Work Environment

Model	1KVA-3KVA series
Temperature	0℃～40℃
Relative humidity	0～95% non-condensing
Altitude	＜1500m. when ＞1500m, lower the rated power for use
Store temperature temperature	-25℃～55℃

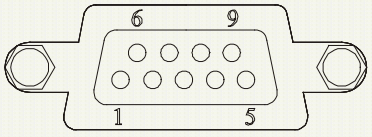
◆ Mechanical Specification

Model	Dimension W*D*H	Net weight/Gross
1KVAS	144*361*215	10.2/11
1KVAH		5.2/6
2KVAS	191*428*337	19.5/21.1
2KVAH		9.5/11.1
3KVAS		24/25.6
3KVAH		9.7/11.3

6.5 Communication interface

6.5.1 RS232 communication interface

This UPS provides a standard DB9 communication interface on its rear panel, the definition of the pins is as following:



Pin	Definition
1、4、6、7、8、9	No use
2	Transmit
3	Receipt
5	GND

6.5.2 RS232 cable specifications

When connecting the UPS with PC by RS232 cable, it needs to use the standard RS232 cable, the detailed cable NO. are as following:

PIN 1 (hole) to computer serial port	PIN 2(needle)to UPS serial port
2	2
3	3
5	5

6.5.3 Optional communication interface

①USB communication interface

USB communication interface: Install the intelligent monitoring software UPSilon2000 which is equipped with the UPS. Then it can achieve the communication with monitoring device directly. When RS232 and USB are provided, only one of them will be chosen and USB is preferred.

②Intelligent slot

The following intelligent cards can be installed into the intelligent slot of the UPS: intelligent USB card, intelligent SNMP card and intelligent dry contact card. Support the hot plug and play. Any card of them can be used according to users' requirements.

a) Intelligent USB card: Use the monitoring function of the USB interface system to monitor and manage the power source of the UPS.

b) Intelligent SNMP card: When connecting to the internet by SNMP card, it communications with the monitoring computer to monitor power source of the UPS from far end.

c) Intelligent dry contact card: Use the monitoring function of the dry contact interface system to monitor and manage the power source of the UPS.

NOTE: Remove the cover before installing the optional accessories. Intelligent Slot can be used together with RS232.
The operating instruction of the UPSilon2000 can be acquired from the CD.
As for the operating instructions of the intelligent USB card, SNMP card and dry contact card, please refer to the relative special instructions.